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JUDUL: **EMERGENCY BEACON FOR ELDERLY**

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Saya **CHONG SOON WOEI (881102-04-5481)**
(HURUF BESAR)

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81100 JOHOR BAHRU,
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EMERGENCY BEACON FOR ELDERLY

CHONG SOON WOEI

This thesis is submitted as partial fulfilment of the requirements for the award of the Bachelor of Electrical Engineering (Hons.) (Electronics)

Faculty of Electrical & Electronics Engineering
Universiti Malaysia Pahang

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ABSTRACT

Emergency Beacon System has become a necessity as the demand for double-income families is increasing these days. Due to the limitation of reality, people nowadays are not capable of taking care of the elderly. At the same time, the tremendous increase of cases of sudden death among solitary living elderly had drawn attention to the society to solve this problem. Hence, attaching an emergency beacon system with the elderly will guarantee the safety of the elderly where immediate assistance will be provided when the system is activated. Currently, several types of cell phones in the market attempted to provide solution to this problem by including emergency beacon function such as speed dialing. However, these beacons are using voice based emergency system and is not efficient due to the nature where human will feel panic or blank out their mind when emergency occurs and resulting in difficulties in providing correct information when something emergency occurred. Besides that, it is difficult for elderly with vision problem to press the speed dial button if depending on cell phone. These issues might delay the rescue time and cause some avoidable tragedies. These limitations become a motivation to develop an easy to operate, low cost, SMS based and user friendly emergency beacon system. The purpose of this microcontroller-based emergency beacon system is to send multiple text messages to certain preset numbers by activating a push button via GSM network. Color coded dedicated push button make it easy for elderly to send emergency message. An alarm function will remind elderly to update their current status for their family or guardian. Necessary information will preset into the system and sent out automatically to resolve the issues of blank out during emergency. For further enhancement, this system can be integrated using a GPS module to detect the current location and it will become a perfect emergency beacon system which can be used in any place to trace the location of the sender to provide necessary assistance immediately.

ABSTRAK

Sistem kecemasan menjadi satu keperluan untuk keluarga dua pendapatan yang semakin meningkat hari ini. Disebabkan had realiti, kebanyakan orang tidak mampu menjaga warga tua. Pada masa yang sama, kes-kes kematian meningkat dengan mengejut di kalangan golongan tua yang tinggal bersendirian. Isu ini telah menarik perhatian kepada masyarakat untuk mencari penyelesaian. Oleh itu, melampirkan satu sistem kecemasan dapat menjamin keselamatan warga tua di mana bantuan segera akan disediakan apabila sistem diaktifkan. Kini, beberapa jenis telefon bimbit di pasaran cuba untuk menyediakan penyelesaian kepada masalah tersebut dengan manambahkan fungsi kecemasan seperti dailan cepat. Walau bagaimanapun, sistem tersebut menggunakan sistem kecemasan berasaskan suara dan tidak cekap kerana sifat manusia akan berasa panik apabila kecemasan berlaku dan mengakibatkan kesukaran dalam menbagi maklumat yang tepat. Selain itu, ia juga merupakan satu masalah untuk warga tua yang mempunyai penyakit mata. Isu-isu ini akan menangguhkan masa menyelamat dan menyebabkan tragedi berlaku. Batasan-batasan ini menjadi motivasi untuk membina sebuah sistem kecemasan yang mudah beroperasi, kos murah, dan meminta pertolongan berasaskan SMS. Sistem kecemasan yang berasaskan mikropengawal dapat menghantar mesej teks kepada nombor yang tertentu dengan mengaktifkan satu butang melalui rangkaian GSM. Butang yang berlainan warna memudahkan warga tua untuk menghantar mesej kecemasan. Fungsi penggera akan mengingatkan warga tua untuk mengemaskini status semasa mereka untuk keluarga atau penjaga mereka. Maklumat yang diperlukan akan diyimpan dalam sistem dan dihantar secara automatik untuk menyelesaikan isu-isu yang berlaku semasa kecemasan. Untuk memajukan sistem tersebut, sistem ini boleh diintegrasikan dengan menggunakan modul GPS untuk mengesan lokasi semasa dan ia akan menjadi sistem kecemasan yang sempurna dan dapat digunakan di mana-mana tempat.

CHAPTER 1

INTRODUCTION

1.1 Project Background

Children nowadays are busy with their careers and spend most time at work. In order to work without any trepidation, they prefer to send their elderly parents to senior care homes during working hour. Unfortunately, most of the elderly refuses to go or feels uncomfortable going to the senior care homes. They would rather stay at home alone. So, the only option for the children is to leave their elderly parent at home for most of the time. This is causing burden or worry among children, especially if their elderly parent are ills. The elderly may face higher risk in their safety. Serious illness such as heart disease or asthma, need emergency care and can be fatal if emergency aid was not provided. It is very dangerous if the illness becomes serious suddenly and there is nobody around or it is not being noticed, it may lead to death.

To solve this problem, most children will buy a cell phone for their elderly parent for contact purpose. They expect their elderly parent to call them or the emergency response center when they are not feeling well. Hence, for those who have elderly staying home by themselves, the elderly will be provided with a cell phone to be used in case of emergency as a solution.

1.2 Problem statement

Nowadays, the number of cases of death among solitary living elderly is still increasing. This is because, for the elderly, cell phone usually is not a good and effective method of contact during emergency situation. The elderly may fail to recall the phone number of their family members when they are in panic or in pain. Besides that, the probability of key-in wrong number is also high enough to be considering as a factor. Another factor is the failure of the elderly to deliver emergency message or failure to provide accurate information during emergency situation. These problems may delay the time taken to deliver the first aid fast.

In order to solve the problems of cases of key in the wrong phone number, failure to recall phone number or failure to deliver emergency message, an emergency beacon was develop where emergency message can be sent via short message service (SMS) to preset numbers by just pressing a button. This provided conveniences and developed an easy way for elderly to transfer their personal information including address and brief medical record in case of emergency.

1.3 Objective

The objective of this project is to develop a microcontroller based emergency beacon for the elderly utilizing the wide coverage of GSM network. In order to meet the main objective, the following sub-objectives were pursued:

i. To develop an algorithm that relay an emergency message using short messaging service (SMS) over a GSM network.
ii. To develop hardware circuitry for interfacing a GSM module with a microcontroller based human- machine interface (HMI) system.

1.4 Project Scope

The work reported in this thesis is limited to the design and development of an Emergency Beacon with the following specification:

i. Utilize GSM 900/1800 network
ii. Three (3) user programmable emergency preset number
iii. One (1) emergency button (Red)
iv. One (1) reply button (Black)
v. User programmable Emergency message template
vi. User programmable Message template

A wire-wrapped prototype was build for design verification. Basic functional tests were conducted to ensure the design prototype meets the required operating specification.

1.5 Organization of This Thesis

This thesis is discussed about the development of microcontroller based emergency beacon system. The emergency beacon system is using GSM network to send emergency SMS to certain contact numbers. This thesis begins with some overview of GSM network and comparison between different kinds of emergency beacon system that available in current market.

Major components and system algorithm will be discuss in detail includes how the components interface among each others. Result and several testing are presented before conclude the outcome of project development, future recommendation and commercialization.

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